

# Unit 17 - Week 11: Algebra

## Course outline

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Week 1: Mathematical Logic

Week 2: Mathematical Logic

Week 3: Mathematical Logic And Set Theory

Week 4: Graph Theory

Week 5: Graph Theory-II

Week 6: Set Theory & Number Theory

Week 7: Set Theory & Number Theory

Week 8: Combinatorics

Week 9: Combinatorics

Live Session-1

Week 10: Number Theory

Live Session-2

Week 11: Algebra

Introduction to Groups

Modular Arithmetic and Groups

Dihedral Groups, Isomorphisms

Quiz : Assignment 11

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Week 12: Algebra-II

## Assignment 11

The due date for submitting this assignment has passed.  
As per our records you have not submitted this assignment.

**Due on 2019-10-16, 23:59 IST.**

1) Which of the following algebraic structures form a group? 4 points

- The set of integers under subtraction.
- The set of integers under addition.
- The set of rational numbers under multiplication.
- The set of complex numbers under multiplication.

- 2  
 1  
 3  
 4

No, the answer is incorrect.

Score: 0

Accepted Answers:

2

2) Which of the following algebraic structures have the associativity property? 4 points

- The set of integers under subtraction.
- The set of integers under addition.
- The set of rational numbers under multiplication.
- The set of complex numbers under multiplication.

- 2  
 3  
 4  
 1

No, the answer is incorrect.

Score: 0

Accepted Answers:

2

3

4

3) Consider the set of numbers  $\{1, 2, \dots, n-1\}$  under  $\pmod n$  multiplication. For what all values of  $n$ , is this algebraic structure a group? 4 points

- 7  
 11  
 25  
 10

No, the answer is incorrect.

Score: 0

Accepted Answers:

7

11

4) Consider the set of numbers  $\{0, 1, 2, \dots, 99\}$  under  $\pmod{100}$  multiplication. How many elements in this set have a multiplicative inverse? 4 points

- 40  
 50  
 60  
 100

No, the answer is incorrect.

Score: 0

Accepted Answers:

40

5) Consider the set of numbers  $\{0, 1, 2, \dots, 15\}$  under  $\pmod{15}$  multiplication. What is the multiplicative inverse of 7? 4 points

- 7  
 8  
 9

Does not exist

No, the answer is incorrect.

Score: 0

Accepted Answers:

7

6) Consider the set of numbers  $\{0, 1, 2, \dots, 99\}$  under  $\pmod{100}$  addition. How many elements in this set have an additive inverse? 4 points

- 100  
 50  
 60  
 40

No, the answer is incorrect.

Score: 0

Accepted Answers:

100

7) How many non isomorphic groups are there whose order is 4? (Order of a group is the number of elements in it.) 4 points

- 2  
 1  
 3  
  $\infty$

No, the answer is incorrect.

Score: 0

Accepted Answers:

2

8) How many non isomorphic groups are there whose order is 5?(Order of a group is the number of elements in it.) 4 points

- 1  
 2  
 3  
  $\infty$

No, the answer is incorrect.

Score: 0

Accepted Answers:

1

9) Consider the dihedral group  $D_n$  generated by the two elements  $r$  and  $s$  where  $r$  is the rotation (about the center) by  $\frac{2\pi}{n}$  radians and  $s$  a reflection about a line passing through the origin. Assume  $n = 10$ . What is  $(sr^9)(sr^7)$  equal to? 4 points

- $r^8$   
  $r^7$   
  $r^9$

None of the other choices are correct

No, the answer is incorrect.

Score: 0

Accepted Answers:

$r^8$

10) Consider the dihedral group  $D_n$  generated by the two elements  $r$  and  $s$  where  $r$  is the rotation (about the center) by  $\frac{2\pi}{n}$  radians and  $s$  a reflection about a line passing through the origin. Assume  $n = 10$ . What is the inverse of  $r^6 s$ ? 4 points

- $r^6$   
  $r^6 s$   
  $r^4 s$

None of the other choices are correct

No, the answer is incorrect.

Score: 0

Accepted Answers:

$r^6$